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# HOW TO IMPROVE FOREST GAME HABITAT

By Nathan A. Byrd and Herman L. Holbrook\*  
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## INTRODUCTION

About 60 percent of the total land area in the South-east is in forest land. Thus, foresters have a unique opportunity to provide quality habitat for many wild-life species — both game and non-game — through silvicultural practices.

This bulletin summarizes information found in the "Management by Species" section of the Southern Region Wildlife Habitat Management Handbook. It provides the practicing forester a ready field reference by stand classes on how to improve or maintain the habitat of five popular forest game species through modification of silvicultural treatments he may prescribe.

## GOVERNING FACTORS

The three governing factors for timber - wildlife management opportunities are: (1) objectives of the landowner, (2) natural physical capabilities of the land and (3) the game species present in the area. Where timber markets exist, it is almost always possible to improve the habitat of some game species through silvicultural practices. The degree of improvement will usually depend on income or "values received" by the owner as compared to reduced timber receipts.

## HABITAT NEEDS

**Gray Squirrel.** Hardwoods are a must for gray squirrels. They require partial hardwood stands of trees old enough (25 years) to produce mast and provide dens (40 years). The squirrels home range is 2—8 acres. Reproduction is 2½ times more successful in tree cavities than nests. Den entrance holes are usually 2½—3 inches in diameter and den cavities 14 inches in depth. They should be waterproof and 15 feet or more above ground level. A squirrel needs about 1½ lbs. of hard mast per week from September through March. Preferred foods are hickory nuts, beechnuts, white oak group and black (or red) oak group acorns, in that order. Supportive foods are berries, soft mast, buds, seeds, and fungi. Red maple is particularly important in early spring and mulberry in May and June.

## CATALOGING - PREP



Typical seasonable foods of gray squirrels are:

August-October	November-January	February-April	May-July
Hickory & Pecan	Hickory	Acorns	Buds & Flowers
Beech	Beech	(Blk Oak Grp.)*	Berries
Blackgum	Walnut	Hickory	Mulberry
Acorns	Acorns	Beech	Fungi
(White Oak Grp.)*	(White Oak Grp.)*	Buds & Flowers of	Blackberry
Acorns	Acorns	Maple, Elm,	Yellow
(Blk. Oak Grp.)	(Blk. Oak Grp.)	Oak, etc.	Poplar
Sugarmaple seeds	Blackgum	Fungi	
Pine seeds	Yellow Poplar	Red Maple seeds	
Walnut		Magnolia	
Fungi		Cucumber	
Dogwood			
Hawthorn			
Hornbeam			
Chinquapin			
Yellow Poplar			
Black cherry			

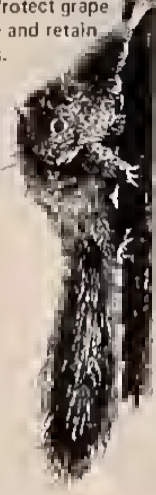
\* The black (or red) oaks are characterized by bristles on the tips of leaf lobes and fruit matures at end of second season. White oak fruit matures at the end of the first growing season and leaf lobes are not bristle tipped.




# Timber Prescription Guides for Wildlife Habitat Management

## By Stages of Stand Development


### GRAY SQUIRREL

Seedling or Open	Sapling	Pole	Young Sawtimber	Mature Sawtimber
Exclude fire and grazing. Without desirable hardwood sprout or seedling reproduction, opportunities for habitat improvement are slim. If present when regenerating, retain two den trees per 5 acres that have a 25-year life expectancy or more.	Thin to release a variety of oaks, hickory, walnut, beech and pecan trees. Protect grape vines, exclude fire and retain vigorous den trees.	Thin early and heavy to release mast trees and to promote vigorous growth of future sawtimber trees and understory fruit-bearing shrubs and trees. Retain existing or potential den trees such as maple, beech, and black cherry. Promote vigorous growth of future sawtimber and fruiting of understory shrubs and trees. Oak, beech and hickory should comprise about 1/2 of stand.	Cut to favor a good mixture of large mast producers and den trees. Retain existing den trees and thin. Protect grape vines. Thin heavily dense mid-stories.	Make salvage and sanitation cuts and retain a variety of healthy mast producing and den trees. Prior to regeneration, make heavy cuts to encourage oak reproduction. Regenerate hardwoods with clearcuts or large group selection to get rapid early growth. Inventory to assure that oak reproduction is present prior to regeneration harvest cutting.
				


### BOB WHITE QUAIL

Seedling or Open	Sapling	Pole	Young Sawtimber	Mature Sawtimber
This stage of pine stands can be most productive for quail since regeneration areas are excellent habitat for 1 - 4 years. Double chop during Oct. - March to lengthen period of site preparation for quail. Plow out or leave one-year roughs one acre in size for nesting. Plant pines at wide spacing (300-500 per acre). Protect old home sites, spring heads and branch bottoms. If warranted, plant legumes in long, narrow (about 20 ft. wide) food strips through the woods (see local game biologists for species).	Prescribe burn older sapling pine stands to encourage herbaceous growth. Thin to hasten stand development and open forest floor. Maintain small openings with disc or fire. Protect old house sites, branch stringers, and food patches.	Thin early and heavy in pine stands. Prescribe burn in 3-yr. intervals to promote grasses, weed seeds. Exclude fire from the best seed and berry producing understory areas.	Develop park-like pine sawtimber stands by thinning and burning. Exclude fire from edges, plum thickets and fringes of branch bottoms. Prescribe burn portions of stands on 2 - 3 year schedule. Plow out one-year roughs for nesting and special food areas. Use natural openings and fire-breaks for supplemental food patches of 1 to 2 acres per 160 acres. Plant legumes such as lespedeza bicolor, partridge pea and common lespedeza. Strips should be long and narrow and lead away from bays and springs.	Maintain park-like stands. At regeneration, protect seed and fruit bearing trees and shrubs along fringe or edge. Log and do cultural activities in winter or late fall. Under such conditions pine stands can be managed for decades on good sites if trees are given room to grow and if selected insect and disease tree removals are made. Prescribe burn on 2 to 3 year interval.
				

### WHITE TAILED DEER


Seedling or Open	Sapling	Pole	Young Sawtimber	Mature Sawtimber
Plant pine seedlings at 10' x 10' or greater spacing (436 or less per acre). Prepare sites in early spring. Favor burning over mechanical means to retain root crowns of browse plants. Protect hardwood regeneration from grazing and over-browsing. Avoid long continuous windrows that deter deer movement. Retain old house sites, water areas, thickets and unique winter cover areas (primarily in oak-hickory stands.)	In older sapling pine stands, prescribe burn to produce forbs and browse. Thin hardwood stands to favor oaks and other fruit bearers. Favor a variety of high and consistent fruit and nut yielders. Exclude fire and grazing from hardwood stands.	In thinnings, favor oaks and other mast trees. Stimulate early diameter growth. Retain a wide variety of fruit and mast trees in the understory. In hardwood stands favor black oaks 2 to 1 over white oaks, and exclude fire.	Selectively cut hardwood stands, cut to maintain a variety of mast trees; where it is scarce, protect winter cover and browse such as honeysuckle, laurel, etc. Prescribe burn pine stands every 3 - 5 years. Intermediate cuts help produce sprouts and other browse. Maintain openings by burning or mowing.	Maintain hardwood stands at full or near-full stocking until regeneration; then cut stand heavy enough to encourage oak reproduction. Protect evergreen browse, cover and water areas in harvest cuts. Offer regeneration of mature hardwood mast stands where scarce (less than 20% of area within a 300-acre range). Cut pine stands frequently to maintain understory browse variety and break up dense midstories. When regenerating select and retain key areas such as hardwood component stringers, evergreen browse patches, water holes, old orchards, etc.
				

### RUFFED GROUSE

Seedling or Open	Sapling	Pole	Young Sawtimber	Mature Sawtimber
Prepare sites for conifers and maintain openings by prescribed fire or discing possibly in early spring. Protect and maintain old house places, thickets of thornapple and grape, old apple trees, and patches of clover, which are aids to hunting. Plant or encourage conifer patches (1 to 5 acres in size) in extensive hardwood areas.	Develop a wide variety of species when making precommercial thinnings. Break up extensive stands of conifers with pockets of hardwood.	Cut to maintain a variety of tree species and encourage understory shrub growth. Thin early and frequently.	Maintain rapid growth of overstory and a vigorous shrub understory through thinnings. Reduce mid-story stems. Maintain variety of species mixture in overstory and understory.	Maintain vigorous shrub understories while favoring rapid growth in the overstory through thinnings. Regenerate in well-distributed stands (1 to 40 acres in size). Space and schedule cuts to make at least one available during each cutting period.
				

### WILD TURKEY

(Not completely manageable on small tracts, but purposeful stand management can help support turkeys and attract them to specific areas.)

Seedling or Open	Sapling	Pole	Young Sawtimber	Mature Sawtimber
This stage provides nesting and brood range. Plant pines at 10' x 10' or 10' x 12' spacing to aid rapid stand development and lengthen the grass and forb production period. Avoid site disturbances Mar. through June to protect nesting and brood areas. Manage for sawtimber rotation in both pine and hardwood stands. One-fourth of each square mile should be managed to produce mast bearing species if possible.	In hardwoods thin to favor oaks, beech and other turkey mast. In older sapling pine, burn Dec. - Feb. to encourage grass and forb production. (Turkeys seldom use stands of this stage.)	Thin to release mast producers in hardwoods and pine hardwood stands. Retain 20 to 50% of the stand in oak and beech. In pine, prescribe burn portions of the stand at 3 to 5 year intervals in Dec. through Feb. Protect shrubs bearing fruits and soft mast in selected areas, especially in transition zones between pine hills and bottoms when burning.	Cut to improve and maintain a variety of mast bearing trees and fruit bearing shrubs. Break up large areas of dense understory. Use fire or logging to keep pine stands open. Confine harvesting season to July - Feb. and remove all products in same operation to reduce disturbance.	Apply 80 to 100 year rotation. Maintain pine in medium to fully stocked stands to prevent a heavy midstory. Burn pine stands in Dec. - Feb. on a 3 to 5 year cycle. Consider surrounding stands in selective regeneration areas to maintain diversity. At harvest and before regeneration, plan to remove all commercial and noncommercial stems to assure development of intolerant mast bearing seedlings and sprouts. Harvest July - Feb. in one operation or as quickly as possible in stand sizes up to 100 acres in size. Distribute cuts to minimize disturbance and other impacts and retain sawtimber stands needed for turkey habitat.
				



**Bobwhite Quail.** Interspersed open forests, brush, grass, and cultivated fields are the best habitat for quail, but they survive in many forest types. Choice nesting cover is one-year-old grass. They also nest at the edges of forest clearings. Each nesting pair should have access to clearings 1/5-acre or larger. Eighty-five percent of the quail diet consists of seeds. Legume, grass, and weed seeds are most important foods (in that order). Normal range is 40 acres. Quail nest from April to September.



Important food species common to Piedmont and Coastal Plains forests, together with plant part utilized are:

#### Herbaceous Plants

Ragweed  
Beggarticks  
Partridge Pea  
Goatweed  
Chufa, nut grass  
Tick trefoil (beggartweed)  
Wild millet  
Lespedeza  
Grasses  
Pokeweed  
Smartweed  
Vetch  
Panicum  
Milk Peas  
Butterfly peas

#### Trees, Shrubs, and Vines

Seed	Maple	Seed
Seed	Hackberry	Seed
Seed	Flowering dogwood	Seed
Seed	Persimmon	Seed
Tubers	Bayberry	Seed
Seed	Blackgum	Seed
Seed	Pines, longleaf, loblolly (preferred)	Seed
Seed	Cherry	Seed
Berry	Oaks	Seed
Seed	Sumacs	Seed
Seed	Blackberry	Berry
Seed	Grapes	Berry
Seed	Magnolia, bay	Seed
Seed	Sweetgum	Seed

**White Tailed Deer.** Deer survive in most forest and non-forest conditions and types. The early stages of timber rotation and intermediate cuts produce abundant deer browse and fruits. During the fall and winter, deer prefer hard mast (acorns, pecans, beech-nuts) and evergreen forage. Rapid-growing green browse and herbage are principal spring and summer foods. Deer require about 6 to 8 lbs of green weight food daily for each 100 lbs. weight. Their home range seldom exceeds 300 acres where food, cover and water are interspersed. Prescribed burning and fertilization attract deer because of improved nutrition and palatability of food plants.

Important deer browse species by physiographic province, in order of preference are:

#### Mountains

Greenbriar  
Azalea  
Blueberry  
Chestnut  
Dogwood  
Blackgum  
Oak  
Sourwood  
Mtn. Laurel  
Huckleberry  
Strawberry Bush  
Buffalo Nut  
Japanese Honeysuckle  
Blackberry  
Sumac  
Hydrangea  
Aralia  
Grape  
Rhododendron

#### Piedmont

Japanese Honeysuckle  
Greenbriar  
Yellow Poplar  
Azalea  
Viburnums  
Sourwood  
Blackgum  
Dogwood  
Soft Maple  
Blueberry  
Cherry  
Persimmon  
Blackberry  
Strawberry-Bush

#### Coastal Plain

Black Titi  
Tall Gallberry  
Greenbriar  
Honeysuckle  
Blackberry  
Yellow Jessamine  
Myrtle Holly  
Wild Rose  
Deer's Tongue  
Mushrooms  
Sumac  
Prickly Pear  
Yaupon  
Sassafras  
Viburnums  
Strawberry-Bush



**Ruffed Grouse.** This game bird is found in the southern Appalachian Mountains and the Cumberland and Appalachian Plateaus, usually above 2,000 feet in elevation. It prospers in the early stages of forest succession but occurs in mature stands as well. Grouse use fruit, seed, catkins, buds and green parts of over 300 plants for food. Broods require insects from late May through July. Thickets, vine tangles and dense shrub growth are used for escape cover. Nesting cover is usually open understories near drumming logs and openings or old logging roads that serve as brood range. Home range is 40 to 50 acres.



Some favorite plant foods of grouse are:

Spring	Summer	Fall	Winter
Apple	Blackcherry	Crataegus	Birch
Serviceberry	Raspberry	Apple	Hophornbeam
Yellow Birch	Blackberry	Viburnum	Grape
Sumac	Dewberry	Beech	Apple
Strawberry	Strawberry	Huckleberry	Acorns
Hophornbeam	Mulberry	Sumac	Greenbriar
Various Catkins	Touch-Me-Not	Birch	Hazelnut
	Partridge berry	Dogwood	Sumac
	Crataegus	Grape	Laurel
		Acorns	Clover
			Teaberry
			Gold Seal
			Hepatica
			Christmas fern

**Wild Turkey.** Good turkey habitat contains mature stands of mixed hardwoods, groups of conifers, relatively open understories, scattered clearings, well-distributed water, and reasonable freedom from disturbance. Home range is about one square mile. Turkey diet consists primarily of grass and weed seeds in the fall, mast and forage in winter and spring, and forage and insects in summer. Acorns, dogwood berries, clover and pine seed are the foremost foods. Soybeans, corn, chufas and pasture are the agricultural crops most frequently used. Openings are essential for brood range.



## FOOD OF WILD TURKEY

### Grass and Weed Seeds

Paspalums (bull grasses)  
Panicums  
Native Legumes

### Hard Mast

Acorns  
Beechnuts  
Pecans

### Forage

Clovers  
Grasses  
Sedges

### Soft Mast

Dogwood  
Grapes  
Cherries

### Other Tree Seeds

Sweetgum  
Pine

### Insects and Snails

Grasshoppers  
Millipedes  
Insect Larvae

### Berries

Blackberries and Dewberries  
Huckleberries  
Strawberries

### Grain

Oats  
Corn

## EXPECTED ACORN YIELDS

POUNDS (AIR-DRIED) PER SQUARE FOOT OF BASAL AREA

AT INDICATED DIAMETER

DBH(BA)	Chestnut Oak	White Oak	Post Oak	Northern Red Oak	Southern Red Oak	Scarlet Oak	Black Oak	Water Oak	Black- jack Oak	Sand- jack Oak
4 ( .09)			1.2							6.1
6 ( .20)			2.9							6.5
8 ( .35)			3.0						.9	5.9
10 ( .55)	1.8	1.3	2.8	.7	.6	4.5	2.0	.8	2.3	5.1
12 ( .79)	3.7	1.9	2.5	2.8	1.0	4.9	2.2	2.6	2.9	
14 (1.10)	4.5	2.5	2.3	5.0	1.4	5.1	2.1	3.4	3.0	
16 (1.40)	4.5	3.1	2.1	7.1	2.0	5.7	2.0	5.1	3.3	
18 (1.80)	4.5	4.8	1.9	8.0	2.7	6.7	1.9	4.0	2.7	
20 (2.19)	4.0	4.8	1.8	7.2	3.6	6.8	1.8	4.0	2.7	
22 (2.64)	3.7	4.3	1.7	6.5	4.6	6.6	1.7	3.9	2.6	
24 (3.14)	3.2	4.0		4.9	5.8	5.7	1.7	3.8		
26 (3.69)	2.8	3.6		3.7	6.5	5.0	1.6			
28 (4.28)	2.5	3.0		2.9		4.3	1.5			
30 (4.91)	2.2	2.5		2.0		3.7	1.4			

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